Abstract

Title: Degenerative changes in the cervical spine with a focus on the intervertebral disc prolapse and its verification using imaging methods and 3D model

Objectives: The aim of this work is to describe the problems of degenerative changes in the cervical spine with a focus on the intervertebral disc prolapse. The second part deals with the possibility of imaging methods that are able to detect pathological processes. Part of this work is the study of three cases of patients with a diagnosis of disc herniation. In conclusion, there are some possibilities of 3D modeling of the cervical spine.

Methods: The theoretical part is based on the available literature. Images from MRI were obtained from medical facilities in Prague, described and assessed by a specialist. After studying the functions suitable graphical programs were created 3D models of the cervical spine.

Results: Degenerative changes in the cervical spine naturally come from the aging of the organism, but a number of modifiable factors accelerating the onset. Among such factors include especially hypokinesia and unilateral overloading of cervical spine. Modern imaging techniques can in detail detect these pathological processes, but are limited by the patient's position during the investigation. The resulting series of images are used as the basis for further processing and creation of 3D model, which displays tissue specific for patients and generally can be used for other solutions space and stress calculation procedures in mathematical modeling of biomechanical solutions to the problem in the cervical segment of the axial system of man.

Keywords: degenerative changes, the cervical spine, imaging methods, 3D model